

TISSUE SPECIMEN HOLDER

ABSTRACT

A tray or holder for tissue specimens, especially of excised tissue, such as biopsied specimens, is used with a confocal imaging system, especially a laser scanning confocal microscope system. The tray may be disposable after imaging of the specimen carried therein or may archive the specimen. A window supports the specimen. Clamps mounted inside the tray restrain the tissue. A compliant bag is mounted outside the tray on one side of a window of the tray on which the specimen is disposed. During imaging the specimen is immersed in a liquid contained in the tray having an index of refraction which closely matches the index of refraction of the tissue. The bag also contains an index matching liquid preferably having the same index as the liquid in the tray. A stabilizing plate is attached to a surface of the bag which faces the window. An objective lens of the confocal imaging system receives and supports the plate, preferably by a magnetic coupling ring around the plate which is magnetically attached to the barrel of the objective lens. The lens may be fixed and a mechanism for positioning the tray with respect to the lens in a direction along the optical axis of the lens and in orthogonal directions perpendicular to that axis shares a common support with the lens. Wavefront distortion which may result from an effectively corrugated surface of the specimen is minimized by selecting an immersion liquid which equals the refractive index of the near surface tissues. The tissue determines the index of the immersion fluid. The thicknesses and refractive indices of the window and plate are then determined to correct the residual aberration of the optical system. Different trays having different window and plate thicknesses and indices may be provided for different specimen species such as kidney, liver, cervix, et cetera. Thus, a generic confocal imaging system with a generic objective lens is corrected for image aberration and wavefront distortion due to the surface corrugations of the tissue. The correction is simplified since the bag is compliant and compresses so that the optical thickness along the axis between the objective lens and the focal plane in or at the specimen is substantially invariant whether the beam is focused at the interface between the specimen and the window or within the specimen over a focusing range which can extend over several millimeters.